

EXPLANATION

PDs

Red and light gray conglomerate and sandstone

This rock ranges from soft to hard, poorly sorted, coarse red conglomerate, through interbedded red and light-gray conglomerate to light-gray conglomerate and sandstone. Pebbles and cobbles from 1/8 inch to 10 inches in diameter in red conglomerate include quartzite, metasiltstone, calcareous metasiltstone, fine-grained gray biotitic granite the source of which has not been observed in this region, and some flat, red siltstone cobbles 1/2 by 5/8 inches in cross section. Cement calcareous in places but generally sandy and siliceous. Some 2- to 4-ft interlayered beds of coarse red and gray conglomerate. Quartzite conglomerate contains quartzite boulders as much as 1 ft in diameter, and is associated with 1-inch beds of finely laminated gray sandstone and quartzite. These rocks are believed correlative with the Upper Devonian-Pennsylvanian sequence in the Madam district, New Brunswick (Clark, 1961). Information on rocks exposed at Casanblais Lake was furnished by Bradford A. Hall, Department of Geology, University of Maine, Orono

Qap

Quartz-feldspar porphyry

Fresh, fine-grained, light-gray porphyry with 1/16-inch euhedral phenocrysts of quartz and microcline; biotite and fine muscovite also present in very fine grained groundmass of quartz and feldspar. Porphyry intrudes contact-metamorphosed metasiltstone of the Kellyland Formation along the road about 3/4 mile southwest of Chain Island, near the northeastern corner of the area. Size and shape of intrusive unknown, but assumed small and dike-like. Age relation with nearby quartz monzonite unknown but porphyry is assumed to be post-monzonite

Db

Gray and pink porphyritic quartz monzonite

This rock, informally referred to as Bottle Lake quartz monzonite, is gray or pink, coarse-grained, biotitic or hornblende, porphyritic quartz monzonite. Pluton extends from Waite quadrangle southwestward and westward into Scraggly Lake, Springfield, Winn, Wabassus Lake, Nictaus Lake, and Saponac quadrangles (Rand, 1958; Doyle, and others, 1961; Larrabee, 1963a-d). Believed of Devonian age. Well-exposed at type locality 1 mile northwest of Bottle Lake, along road from Springfield southerly to that lake, Springfield quadrangle, where euhedral microcline phenocrysts up to 1 1/4 inches long and 1 inch wide have ragged texture, and phenocrysts up to 1 inch by 2 inches are common. Distribution of pink and gray biotitic rock random. Age of sample from Bottle Lake locality is about 342 m.y., determined by potassium-argon method (Thomas, R. Marvin, R., and Elmore, P., written communication, July 2, 1962), or about 410 million years, determined by lead-alpha method (Sterr, T. G., written communication, March 23, 1962). Age of sample from road from West Muskegon Lake to Upper Oxbow Lake, Scraggly Lake quadrangle, about 370 m.y. by potassium-argon method, or 380 m.y. by lead-alpha method (Paul, and others, 1963). Age of sample from along Route 1, Waite quadrangle, is 372 m.y. by potassium-argon method, or 400 m.y. by lead-alpha method (Paul, and others, 1963). In Nictaus Lake quadrangle, well-exposed south of outlet of Lower Chain Lake and at road crossing outlet of Upper Chain Lake, where rock is gray, coarsely porphyritic, and hornblende. At the latter locality inclusions of fine-grained biotitic schist are common, and contain porphyroblasts of microcline and hornblende. Where exposed in the northern part of Nictaus Lake, rock is flesh-colored, hornblende and biotitic, and coarsely porphyritic, with microcline phenocrysts as large as 5/8 by 1 1/2 inches. The apparent southern boundary at Nictaus Lake, based upon large angular glacial boulders (elsewhere useful in determining boundaries) is shown about 1.4 miles south of that indicated by Bouguer gravity anomaly. If the contact as drawn is correct, the Bouguer anomaly suggests a considerable change in attitude of contact at shallow depth (Kane, Martin, oral communication, July 13, 1963)

Dw

Gray and pink quartz monzonite

This gray and pink, medium-grained quartz monzonite, informally referred to as Wabassus quartz monzonite, is best exposed on eastern shore of Grand Lake between Grand Lake Stream and Dyer Cove Point -the type area- and in road from Grand Lake Stream village westward to Wabassus Lake, and forms prominent Wabassus Mountain, all in Wabassus Lake quadrangle. Believed of Devonian age. Commonly equigranular, particle size ranges from 1/8 to 3/8 inch; rarely porphyritic, with microcline phenocrysts 1/4 by 1/2 to 1 inch. Gray and leucocratic on Amazon Mountain, Big Lake quadrangle; pink or gray, and biotitic or hornblende elsewhere. Distinctly different from coarsely porphyritic quartz monzonite in separate pluton in northern part of Nictaus Lake quadrangle. Where exposed in southeastern part of quadrangle, is gray, medium-to coarse-grained, and in places porphyritic. Shearing observed along road and also at Nictaus Lake, as shown in fig. 2

Sk Sks

Kellyland Formation

Gray, chiefly carbonate-bearing metasiltstone and sandstone, slate, and quartzite

Medium-gray, carbonate-bearing, metasiltstone and slightly metamorphosed impure sandstone, quartzite, and darker-gray slate (20 percent of unit), have been named the Kellyland Formation (Sk) of Silurian(?) age (Larrabee, 1963c). Iron carbonates are abundant in most beds other than quartzite. Some tuffaceous beds occur. Slate layers from 1 to 8 inches thick, locally 1/8 inch to 4 feet. Metasiltstone and slightly metamorphosed argillaceous sandstone from 4 inches to 4 feet thick, locally 20 feet. Rarely, thinly laminated light and dark sandstone layers occur in metasiltstone. Thin beds of slightly metamorphosed quartz-granule conglomerate associated with sandstone and quartzite beds in places. Metasiltstone commonly has good graded bedding and cross-bedding. Folds small and tight; bedding tops reversed within short distance. Most wells, drilled or dug, yield hard water. Rock sheared at many exposures along Fourth Machias Lake. Hornfels near contact with granitic rocks contains biotite, scattered magnetite, pyrite, and cordierite retrograded to sericite, chlorite, and quartz aggregates that weather out to form pits; these increase in size toward contact, where in places they are size and shape of rice grains. Thickness of formation not ascertained because of lack of outcrops and key beds, and isoclinal folding, but probably several thousand feet. No identifiable fossils unquestionably from this formation have been reported

South of the area on the map shown as Kellyland (Sk) is a lenslike mass (Sks) of light- and dark-gray, thin-bedded chert and metasiltstone, in places carbonate bearing. Some medium- to dark-gray impure quartzite. Silicification irregularly distributed, the degree varying within a hand specimen. Much silicified breccia in places; pyrite common. Rock unit might be Kellyland Formation silicified along fault zone, or an entirely different unit not heretofore observed in general area

O-Cu

Ordovician or Cambrian metamorphic rocks, un differentiated Chloritic quartzite, and green and red slates

Argillaceous and chloritic quartzite, sandy metasiltstone, thin beds of green slate, and rarely thin beds and lenses of red and purplish slate. Rocks of unknown but presumably Ordovician or Cambrian age; remote possibility of Lower Silurian age, as indicated in southeastern corner Danforth quadrangle (Larrabee and Spencer, 1963; Griseom and Larrabee, 1963). Quartzite and sandy metasiltstone, commonly in 1/4 to 1/2 inch beds separated by paper-thin laminae of green slate, minutely crumpled by slippage along slate laminae, and minute folds later folded and rock foliated. This predominantly impure quartzite unit contains green slate beds and lenses from few inches to 2 or 3 feet thick, and occasional lenses of red to purplish slate 1 to 6 inches thick and commonly less than 100 feet long. Rocks well-exposed along Baskhegan Lake in Scraggly Lake quadrangle (Larrabee, 1963b); at Knowlthing Cove, a few 1/8-inch hematite nodules replaced by silica occur in red slate. Rarely, thin pinkish quartz and feldspar granule metaconglomerate present to the southeast. Although outcrops lacking over wide area, where needed for determination of structural and stratigraphic relations, rocks believed faulted up into younger metasedimentary rocks prior to intrusion of Bottle Lake quartz monzonite. Several chloritic argillaceous quartzite outcrops on south shore Fourth Machias Lake, Nictaus Lake quadrangle, believed part of this unit. Where exposed along road in northern part of Iron Mountain quadrangle, and believed to extend into southern part of Nictaus Lake quadrangle on basis of glacial float, unit believed represented by fine-grained purplish-gray, pyritic, biotitic quartzite, dark-gray non-carbonate-bearing metasiltstone and slate, and dark-gray quartz-sericite schist

Structure

Regional trend of metasedimentary rocks is northeast; beds tightly folded, generally dip steeply and in places are overturned. Both quartz monzonite plutons trend northeasterly.

Two northeast-trending faults are inferred to have brought Kellyland Formation into contact with rocks of Ordovician or Cambrian age prior to intrusion of Bottle Lake quartz monzonite. A more recent, major system of discontinuous faults, later than all intrusives of Devonian age, trends generally northeasterly across map into adjacent quadrangles; this trends parallel to and on strike with major Springhill Fault (Smith, J. C., written communication, December 5, 1962) near Fredericton, New Brunswick, and parallel with Fundy and Lubec Faults (Cunning, L. M., 1962) to southeast. Many small quartz, and quartz and calcite veins in shear planes indicate the trend at Fourth Machias Lake. In Kellyland (Larrabee, 1963c), and Waite (Larrabee, 1963a) quadrangles, lenses and blocks of Upper Devonian-Mississippian sedimentary rocks, notably soft, red, calcareous conglomerate and siltstone, have been downfaulted into older rocks; and in Nictaus Lake quadrangle much hard, red and light gray quartzite conglomerate and gray quartzite has been downfaulted. This major fault zone has been traced by the writer almost continuously from the St. Croix River southwesterly about 50 miles, and probably continues into Saponac quadrangle. In New Brunswick, it may continue intermittently from the St. Croix River (Clark, 1961) to Springhill, another 50 miles. Although major trend of faults and shear zones is northeasterly, other more northerly and northwesterly-trending zones of movement are strong (fig. 2). The southeastern and southwestern parts of the area have not been studied, and in fact, this entire quadrangle is deserving of a detailed investigation. Further study of the major fault zone would be of considerable academic interest, at least.

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DEVONIAN

SILURIAN (?)

CAMBRIAN OR ORDOVICIAN

DEVONIAN AND PENNSYLVANIAN

CARBONIFEROUS

DEVONIAN OR YOUNGER

DEVONIAN